Claims

1. Material for the treatment of gaseous media comprising volatile organic compounds, this porous material presenting an adsorption capacity of about 20 to 30% with respect to its dry weight and comprising about 47 to 52 wt% of a composite structure of silicon and carbon, about 12 to 20 wt% carbon, about 5 to 7 wt% hydroxyl, and about 1 to 2 wt% oxygen.

2. Material according to Claim 1, comprising in a peripheral volume (21) corresponding to essentially one-third of the total volume of the material, about 75 to 85% porosities (22), whose dimensions are between 10 and 50 Å and, in the remaining central volume (23), about 80 to 90% cavities (24), whose dimensions are between about 200 Å and 2 μm.

3. Material according to Claim 1 or 2, whose specific surface is between 1200 and 2200 m^2/g.

4. Material according to any of Claims 1-3, comprising about 20 wt% aluminum oxides and about 5 wt% iodides.

5. Material according to any of Claims 1-4, whose relative humidity is lower than 2% of its dry weight.

6. Process for the treatment of a gaseous medium containing volatile organic compounds, consisting of directing a flow of said gaseous medium over a porous material according to any of Claims 1-5, to cause adsorption of this flow, which penetrates the porosities (22) and the cavities (24) of the material (20) then absorption of said flow during which a chemical reaction occurs between the volatile organic compounds of said

flow and the material itself, to transform the volatile organic compounds into nontoxic gases, particularly CO_2 or SO_2.

7. Process according to Claim 6, in which the contact time between the gaseous flow and the material is between 0.08 and 0.12 sec.

8. Process for obtaining a porous material according to any of Claims 1-5, consisting of:

-preparing a base constituent (10) of the clay type comprising about 30 wt% of a clay with a particle size greater than 180 μm and about 70 wt% of a clay with a particle size between 10 and 20 μm,

-impregnating this base constituent (10) with an aqueous solution (19) comprising about 10% by volume of acetic acid, between 5 and 10% by volume of citric acid, and between 15 and 20% by volume of peroxide, the volume of the solution (19) being essentially equal to the volume of the base constituent (10),

-pretreating the base constituent (10) impregnated with said solution (10) by mixing it at a first predetermined speed to create a porous structure,

-mixing, under a pressure between 2 and 10 bar, the pretreated constituent (11) with an acidified liquid (14) with a strong oxidizing potential, at a second speed lower than the first, to cause the liquid (14) to penetrate the pretreated constituent (11) and to form a gel (15), the quantity of pretreated constituent (11) being between 42 and 48% of the total volume mixed, while the quantity of liquid (14) is between 58 and 52% of the total volume mixed;

-mixing said gel (15) with complementary products (16) including a solution with a strong oxido-reductive potential which represents about 10% of the total volume, a mixture of carbon and alumina representing about 12 to 15% of the total volume and calcium sulfate representing about 2% of the total volume;

-drying the resulting mixture by ultrasound treatment of the material which has been mixed and linearly transferred, and

-pressing the dried material (18) under a pressure between 8 and 10 bar.

9. Process according to Claim 8, implemented continuously.

10. Process according to Claim 8 or 9, also consisting of heating the base constituent (10) impregnated with aqueous solution (19) at the time of pretreatment, at a temperature between 200 and 250°C.

11. Process according to any of Claims 8-10, consisting of the emission of ultrasound waves at the time of pretreatment, at a unit power of 2000 W and with an amplitude of 15 to 30 μm.

12. Process according to any of Claims 1-8, consisting of carrying out, at the time of pretreatment, another mixing operation at a third speed lower than the first and second, to enlarge the cavities and porosities of the resulting structure.

13. Process according to any of Claims 8-12, consisting of filtering the liquid (12) resulting from the pretreatment of the preimpregnated base constituent (10).

14. Process according to any of Claims 8-13, in which the acidified liquid associated with the pretreated constituent (11) comprises about 10% by volume of a solution with a strong oxidizing potential.

15. Process according to any of Claims 8-14, in which the pretreated constituent (11) and the liquid (14) are mixed while being heated to a temperature between 90 and 120°C.

16. Process according to any of Claims 8-15, in which the mixing of the gel (15) and the additional products (16) takes place at a temperature between 70 and 80°C.

17. Process according to any of Claims 8-16, in which the treatment by ultrasound waves, to dry the mixture (17) is carried out at a length of 20 to 30 cm, under a specific output of 3-5000 W, an amplitude of 15 to 60 μm, and a frequency of about 20 MHz.

18. Process according to any of Claims 8-17, in which the material (18) is dried under a partial vacuum of 120 to 150 mbar and at a temperature between 90 and 100°C.

19. Process according to any of Claims 8-18, comprising a final stage of extrusion of the material (18).

20. Device for implementation of the process according to any of Claims 8-19, comprising:

-an impregnator (1) including a first mixer (110) rotating at a speed between 1200 and 1400 rpm to form a first mixture (11),

-a first reactor (2) including a second mixer (210) rotating at a speed between 800 and 1000 rpm to accomplish mixing under pressure between 2 and 10 bar, to create a second mixture (15) of the gel type,

-a second reactor (3) including a mixer (310) to create a third mixture (17),

-a device (320, 321) for linear transfer of said third mixture (17) and at least one ultrasound device (305) delivering a power of 3 to 5000 W, on at least one part of the trajectory of said third mixture (17), and

-a high-pressure extrusion device (4).

21. Device according to Claim 20, in which the impregnator (1) includes a heating device (101) for heating to a temperature between 200 and 250°C, as well as a device (104) for emitting ultrasound waves.

22. Device according to Claim 20 or 21, in which a filtration device (129) for filtering the liquid evacuated from the impregnator is associated with the impregnator (1).

23. Device according to any of Claims 20-22, in which the impregnator (1) includes another mixer (121) rotating at a speed between 500 and 800 rpm.

24. Device according to any of Claims 20-23, in which the first reactor (2) advantageously includes a heating device (201) heating to a temperature between 90 and 120°C.

25. Device according to any of Claims 20-24, in which the second reactor (3) advantageously includes a heating device (301) for heating to a temperature between 70 and 80°C.

26. Device according to any of Claims 20-25, in which the linear transfer device of the second reactor (3) is advantageously made up of a double screw (320) whose rotation speed is between 5 and 150 rpm.

27. Device according to any of Claims 20-26, in which the extrusion device (4) includes a variable screw (401) which subjects the material (18) from the second reactor (3) to a pressure between 8 and 10 bar.